UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/769,884	02/03/2004	Jerome Larrieu	0592-1001	9193

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EXAMINER
MOHR, ERIC JOHN

ART UNIT	PAPER NUMBER
2624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/769,884	LARRIEU ET AL.
	Examiner	Art Unit	
	Eric J. Mohr	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 January 2008*.
2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 11-18* is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-6 and 11-18* is/are rejected.
7)☒ Claim(s) *1* is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *31 January 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☒ All   b)☐ Some * c)☐ None of:
      1.☐ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Amendment

1.   Applicants' response to the last office action, filed January 31, 2008, has been entered and made of record.

2.   Objection to the specification is withdrawn in light of the amended specification.

3.   Objection to the title is withdrawn in light of the amended title.

4.   Objection to the drawings is withdrawn in light of the amended drawings.

5.   The examiner agrees with applicants' argument that the limitations of claim 7 (now part of claim 1) are not fully anticipated by Proctor. A new ground of rejection has been introduced to cover this limitation. Therefore, this action has been designation as non-final.

Claim Objections

6.   Claim 1 is objected to because of the following informalities:

a.   The preamble has been corrected by the examiner from "process compression of compressing a block" to "process of compressing a block".

b.   The last section reads "storing the block so that while the block is being stored in the course of which the block is compressed without reference to a reference image" has been examined as "storing the block so that while the block is being stored the block is compressed without reference to a reference image".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8.   Claim 3 recites the limitation "the vector storing step" in claim 1. There is insufficient

antecedent basis for this limitation in the claim. For further examination this limitation has been

interpreted as "the storing step."

Claim Rejections - 35 USC § 103

9.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10.   Claims 1, 3, 4, 13, 17, and 18 rejected under 35 U.S.C. 103(a) as being unpatentable over

Proctor et al., US 6,072,830 (hereinafter "Proctor") further in view of Chen, US 5,241,395

(hereinafter "Chen").

        Regarding claims 1, 17, and 18, Proctor discloses a process of compressing a block

having a size L x H of a sequence of images **(column 9, lines 33-35: break an image into**

square pieces), method comprising performing the following steps, in a repetitive manner, on

said block: searching, in one of the images of the sequence of images, for the zone of L x H

pixels that is the most similar to said block **(column 12, lines 12-38: a block matching**

algorithm finds a similar block with minimum distortion); determining whether the

resemblance between said zone and said block responds to predetermined criteria **(column 12,**

lines 39-41: compare the distortion from block comparison with a predetermined

threshold); if said resemblance responds to said criteria, storing a motion vector which indicates

the distance between the block and the most similar zone found **(column 12, lines 46-55: encode the distortion vector if the distortion is below the predetermined threshold)**; if said resemblance does not respond to said criteria, and if the block does not have a predetermined minimum size, cutting said block into sub-blocks and performing a supplemental repetition on each of said sub-blocks **(column 12, lines 41-46: dividing the block and processing the sub-blocks in a similar manner if the distortion is above the predetermined threshold)**, and if said resemblance does not respond to said criteria, and if said block has a predetermined minimum size, storing the block so that while the block is being stored the block is compressed without reference to a reference image **(column 13, lines 23-27, and lines 42-48: a block is sent to be encoded if it has reached a minimum size and has not passed any of the predetermined thresholds, then sent to an entropy encoder for compression)**. Further, Proctor discloses an apparatus that performs these steps using computer processors **(column 3, lines 45-51)**.

Proctor does not explicitly disclose that the predetermined criteria are dependent upon the L x H dimensions of the block. Chen discloses an image coding system that uses a threshold to process blocks, the threshold being different for blocks of different sizes **(column 9, lines 1-3)**.

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Proctor, and modify the decision threshold to depend upon block size, as taught by Chen, thus allowing for better compression ratios, as discussed by Chen **(column 2, lines 22-34)**.

Regarding claim 3, Proctor discloses the that the searching step includes searching in a plurality of images of the sequence of images, for the zone of L x H pixels that is the most

similar to said block, and the storing step, includes storing data representative of the image

which comprises said zone **(column 11, lines 13-34: the current image block is compared to a

set of previously stored image blocks; and column 12, lines 46-55: encoding the distortion

vector of the most similar block)**.

  Regarding claims 4 and 13, Proctor discloses searching only in the preceding image of

the sequence of images during the search step for the zone of L x H pixels that is the most similar

to said block **(column 10, lines 42-49: matching an image block with a corresponding

preceding image block)**.

11. Claims 2, 11, and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Proctor and Chen as applied to claim 1 above, and further in view of Nieweglowski et al., "A

novel video coding scheme based on temporal prediction using digital image warping,"

(hereinafter "Nieweglowski").

  Regarding claim 2, Proctor discloses that the searching step includes conjointly (a)

determining a zone which is the most similar to said block **(column 12, lines 39-41: comparing

the distortion from block comparison with a predetermined threshold)**, determining, during

the determining step (a), (b) whether the resemblance between said zone and said block responds

to predetermined criteria, and the storing step includes storing vector data, if said zone is the

zone most closely resembling the vector **(column 12, lines 46-55: encoding the distortion

vector if the distortion is below the predetermined threshold)**.

  Proctor does not explicitly disclose applying a transform to the current block before

searching for the best matching zone, and saving the transformation data if the transformed block

best matches a zone. Nieweglowski discloses transforming image blocks to more closely match blocks from a previous frame and saving transform parameters in an existing codec **(see page 143, section 3)**.

Since both inventions are related to image compression using a system employing blocks, It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Proctor and Chen, and modify the block matching step to include the use of spatial image transformation techniques to more closely match the current block to previous blocks, as taught by Nieweglowski, thus reducing block artifacts, as discussed by Nieweglowski.

Regarding claim 11, Proctor discloses that the searching step includes searching in a plurality of images of the sequence of images, for the zone of L x H pixels that is the most similar to said block, and the vector storing step, includes storing data representative of the image which comprises said zone **(column 11, lines 13-34: comparing the current image block to a set of previously stored image blocks; and column 12, lines 46-55: encoding the distortion vector of the most similar block)**.

Regarding claim 12, Proctor discloses that the searching step includes searching only in the preceding image of the sequence of images, for the zone of L x H pixels that is the most similar to said block **(column 10, lines 42-49: matching an image block with the corresponding preceding image block)**.

12.   Claims 5, 15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Proctor and Chen as applied to claims 1, 3, and 4 above, and further in view of Chaddha et al., US 6,584,226 (hereinafter "Chaddha").

Consider claims 5, 15, and 16, Proctor and Chen do not explicitly disclose that the blocks are cut into two sub-blocks of the same dimensions. Chaddha discloses an example of block division in which a 4x4 block is divided into two 4x2 blocks **(column 9, lines 36-49)**.

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Proctor, and modify the cutting step to break each block into two equal sub-blocks, as taught by Chaddha, thus allowing the creation of a binary tree map for efficient encoding, as discussed by Chaddha **(column 9, lines 50-63)**.

13.   Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Proctor, Chen, and Chaddha as applied to claim 5 above, and further in view of Shin et al., US 5,724,451 (hereinafter "Shin").

Consider claim 6, Proctor, Chen, and Chaddha do not explicitly disclose cutting a block into sub-blocks both horizontally and vertically and selecting the cut which optimizes the overall resemblance of the sub-blocks generated by each of said acts of cutting out, with zones of said images of the image sequence. Shin discloses simultaneously cutting an image block into horizontal and vertical segments **(column 6, lines 6-10 and Figure 1),** after which the split producing the lowest distribution values is coded **(column 7, lines 20-30 and Figure 6)**.

It would have been obvious to one skilled in the art at the time the invention was made to modify the invention of Proctor, and modify the splitting and selection steps to split the blocks in multiple directions and retain the values from the split that best compares to a previous image, as taught by Shin, thus reducing step error, as discussed by Shin **(column 3, lines 26-30)**.

14.   Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Proctor, Chen,

and Nieweglowski as applied to claim 2 above, and further in view of Chaddha.

        Consider claim 14, Proctor, Chen, and Nieweglowski do not explicitly disclose

that the blocks are cut into two sub-blocks of the same dimensions. Chaddha discloses an

example of block division in which a 4x4 block is divided into two 4x2 blocks **(column 9, lines**

36-49).

        It would have been obvious to one skilled in the art at the time the invention was made to

modify the invention of Proctor, and modify the cutting step to break each block into two equal

sub-blocks, as taught by Chaddha, thus allowing the creation of a binary tree map for efficient

encoding, as discussed by Chaddha **(column 9, lines 50-63)**.

Contact Information

        Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Eric J. Mohr whose telephone number is (571)270-5140. The

examiner can normally be reached on 7:30am-5pm M-Th, 7:30am-4pm Alternate Fridays.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Jingge Wu can be reached on (571) 272-7429. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Eric J Mohr/
Examiner, Art Unit 2624

/Jingge Wu/

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